

**5. Implementation
Methods With Low
Opportunity Costs**

Management Requirements for other wildlife habitat requirements for Threatened and Endangered Species, Sensitive Species, special habitats, and dead and defective tree habitat are not addressed in this analysis because opportunity costs of providing sufficient habitat to maintain viable populations are less than two percent.

**6. Implementation
Methods That Meet
More Than One
Management Requirement**

Implementation methods selected to meet water quality Management Requirements also provide fish habitat in streams and riparian habitat adjacent to streams to assure the maintenance of viable populations of species dependent on these habitats. Alternative implementation methods for meeting water quality Management Requirements will also meet fish habitat and riparian habitat requirements. No additional discussion or analysis is displayed in Appendix G for these Management Requirements.

**C. WATER QUALITY
MANAGEMENT
REQUIREMENTS**

**1. Source of the
Water Quality
Management
Requirements**

Management Requirements for water quality are based on NFMA which states:

Forest planning shall provide for compliance with requirements of the Clean Water Act, the Safe Drinking Water Act, and all substantive and procedural requirements of Federal, State, and local governmental bodies with respect to the provision of public water systems and the disposal of waste water [36 CFR 219.23(d)].

Special attention shall be given to land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes and other bodies of water. This area shall correspond to at least the recognizable area dominated by the riparian vegetation. No management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment shall be permitted within these areas which seriously and adversely affect water conditions or fish habitat [36 CFR 219.27(e)].

The Clean Water Act seeks to control nonpoint sources of water pollution. To comply with Section 208 of the Act, Forest Service Region 6, the states of Oregon and Washington (which manage implementation of the Act in the respective states) and the Environmental Protection Agency agreed on a process whereby each state reviews Forest Service Management Practices to determine if they meet or exceed state water quality standards. Practices that are judged to meet or exceed the standards are certified as Best Management Practices (BMPs) which the Forest Service then agrees to continue.

**2. Specifications
For The Water Quality
Management
Requirements**

State of Oregon water quality standards (Oregon Administrative Rules 340-41-602 through -615 and -802 through -815) provide specifications to be met by implementation methods selected by the Forest. They are summarized below

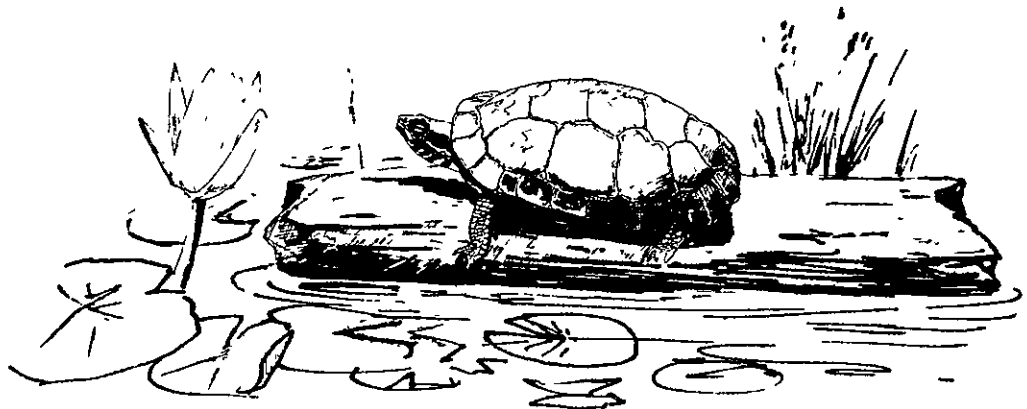
- a. Dissolved oxygen concentration shall not be less than 75 percent of saturation at the seasonal low, or less than 95 percent of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes.
- b. No measurable increases shall be allowed when stream temperatures are 68 degrees F. or greater.. or more than 2 degrees F increase due to all sources combined when stream temperatures are 66 degrees F. or less..
- c. No more than a 10 percent cumulative increase in natural stream turbidity shall be allowed, as measured relative to a control point immediately upstream of the turbidity-causing activity.
- d. pH values shall not fall outside. 6.5 to 8.5 in the John Day basin and 7.0 to 9.0 in the Malheur basin

On the Malheur National Forest, most of the activities which affect water quality are related to livestock grazing, timber harvesting, and erosion from roads. These activities include removal of trees, road construction, burning of brush and organic debris, and grazing of riparian vegetation along stream banks (For more discussion, see FEIS Chapter IV, "Soil and Water" section)

The primary approach to maintaining water quality on Malheur National Forest lands is to maintain sufficient vegetation along stream banks which maintains stream temperatures within acceptable limits

This analysis discusses the approach to maintaining sufficient shade producing vegetation to meet water temperature requirements

In the FEIS, the specifications established by the Forest are called Standards. The required watershed condition, and the Standards that indicate achievement of the water quality Management Requirement are described in the Forest Plan and in the EIS, Appendix D. The following specifications are addressed in this appendix.



**3. Alternative ways
Of Meeting The
Management
Requirements
For Water Quality**

Alternative ways for meeting specifications shown above could be modeled in FORPLAN to simulate the required end conditions. These become alternative constraints in the model that set limits on how FORPLAN schedules timber harvest to maximize Present Net Value. (FORPLAN constraints are discussed in Draft EIS Appendix B, "Development of Management Requirements.") The following alternatives were considered:

a. Alternatives Considered in Detail

(1) Alternative 1

Set-aside Shade Producing Streamside vegetation (no scheduled timber harvest): This alternative is designed to minimize vegetation disturbance and does not allow timber harvest. No shade providing vegetation would be removed (no scheduled timber harvest) in riparian areas.

(2) Alternative 2

Selective Harvest of Shade Producing Streamside Vegetation (scheduled timber harvest): This alternative allows removal of shade producing vegetation from the riparian area. Uneven-aged management is by single tree selection in the ponderosa pine type and group selection in the mixed conifer and lodgepole pine types. Even-aged management may also be featured in these types depending on the site-specific silvicultural prescription that meets the riparian management objectives.

Alternative 2 would result in less streamside shading than Alternative 1 simply because Alternative 2 allows removal of shade-producing vegetation. This approach is designed to maintain existing water temperatures in streams within a watershed as regrowth of shade producing vegetation (previously removed as a result of past activities) balances removal associated with new projects. These prescriptions are applied to a watershed as a whole and the expected results are viewed as a net change over time (zero)

**4. Evaluations of
Implementation Methods
To Meet Water Quality
Management
Requirements**

Either of the alternative means or implementation methods noted above would meet Management Requirements and warranted more detailed analysis

a. Opportunity Costs

The opportunity costs of implementation methods for meeting water quality Management Requirements were estimated by comparing the differences in Present Net Value and Allowable Sale Quantity that occur in FORPLAN runs of the (PNV) Benchmark with and without the constraints that simulate the means for accomplishing the required condition.

Table G-4 compares the Present Net Value and Allowable Sale Quantity opportunity costs of the alternative implementation methods (means) for water quality protection.

TABLE G-4

OPPORTUNITY COSTS ASSOCIATED WITH ALTERNATIVE MEANS FOR MEETING THE WATER QUALITY MANAGEMENT REQUIREMENTS

	FIRST DECADE ALLOWABLE SALE QUANTITY MMCF/YR ^{1/} (MMBF/YR) ^{2/}	CHANGE IN ALLOWABLE SALE QUANTITY ^{3/}	PRESENT NET VALUE ^{4/} MM\$	CHANGE IN PRESENT NET VALUE
PNV Benchmark	53 3 (304 9)	--	638 6	--

Opportunity Cost
Approximate Change.

Opportunity Cost of Meeting

Management Requirements	2 1	4%	43 5	7%
With Alternative 1	(11.8)			
(no vegetative removal)				

Opportunity Cost of Meeting

Management Requirements	0 6	1%	14 5	2%
With Alternative 2	(3 5)			
(selected vegetative removal)				

^{1/}MMCF/YR = Millions of cubic feet per year

^{2/}MMBF/YR = Millions of board feet per year

^{3/}Percent change calculated on cubic foot basis

^{4/}MM\$ = Millions of dollars

b. Consequences of Alternative Ways or Means of Meeting Water Quality

The opportunity costs of not removing any shade producing vegetation in riparian areas for watershed protection are four to five percent greater than the alternative that removed selected shade producing vegetation. This alternative would go beyond simply adhering to the requirement of meeting temperature specifications over time, as the temperature would be enhanced (lowered) as more shade would be provided. The no vegetative removal alternative would enhance fish habitat

c. Rationale for the Selected Implementation Means

Implementation methods (means) for meeting the Management Requirements for water quality are based on practices that existed before the National Forest Management Act regulations. Consequently, interpretations and processes for meeting these requirements are already established on the ground

Alternative 2 represents current practices that have been developed through interaction among soil scientists, hydrologists, foresters, biologists and other professionals. Compliance with these requirements is in large part a result of cooperation with the State of Oregon. Specialists from state and federal land management agencies agreed to the watershed Standards (specifications) that were written and included in the Malheur National Forest Draft EIS. Changing the methods for achieving the specifications may require new state certification processes

By implementing Alternative 2 the Forest would meet minimum state water quality Standards throughout the planning period while minimizing Present Net Value and Allowable Sale Quantity opportunity costs

d. Implications for Forest Plan Alternatives

Final Environmental Impact Statement Chapter II and Appendix B discuss the effects of this alternative way of meeting water quality requirements in Final EIS alternatives. The analysis of opportunity costs of selected means of water quality protection shown in Table G-4 shows the maximum Present Net Value and Allowable Sale Quantity effects. Actual Plan alternatives will have somewhat less opportunity costs as overlaps from lands withdrawn for wildlife, scenery, recreation or other nontimber objectives will help to provide shade producing vegetation

e Role of Monitoring and Research

The assumption that leaving shade producing vegetation on riparian areas is based on extensive research that describes the importance of water temperature for water quality and habitat that maintains viable populations of fish.

Continued monitoring will be done on water temperature fluctuations due to removal and growth of stream shade-producing vegetation. See the Forest Plan monitoring program

**D. MANAGEMENT
REQUIREMENTS FOR
VIALE POPULATIONS
OF EXISTING NATIVE
VERTEBRATE SPECIES**

**1. Source Of The
Management Requirement**

The NFMA regulations require that.

"Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired nonnative vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to ensure continued existence in the planning area. In order to ensure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area." (36 CFR 219.19)